EFFECT OF NITROGEN FERTILIZER LEVELS AND FOLIAR SPRAY ON THE GROWTH, YIELD AND ACTIVE CONSTITUENTS IN DAMSISSA (*AMBROSIA MARITIMA*, L.) PLANT

Mortada, K.R.; Yasser, A.M and Khalid, A.H
Medicinal and Aromatic plants Department, Horticulture Research Institute, Agriculture Research Center, Giza, Egypt.

ABSTRACT

Field trials were conducted during 2011and 2012 seasons in the private farm of Kom Ombo, Aswan Governorate, Egypt to study the effect of various rates of chemical N and foliar spray) treatments and the combinations between them on growth, yield and chemical constituents of damsissa (*Ambrosia maritima*, L.) plants. Nitrogen (ammonium sulphate) with three levels (0,100 and 200 kg/fed) was used and Nutri- Leaf (N20-P20-K20)+Me treatments (0, Lf 100 and Lf 200 ppm.) added as foliar spray three days after irrigation till run-off, 3 times during preparing the experiment field. The data shows that treading plants with nitrogen and Nutri-Leaf significantly increased the vegetative growth compared with control. Likewise, all fertilization treatments greatly raised the percentage of N, P and K in the herb, as reached by the increased fertilization maximum. As for fresh and dry herb, the data showed that using nitrogen and 200 kg and Nutri-Leaf at 200 ppm. can be used to significantly increase these parameters and active substances (ambrossin, damssin and sesquterpene).

Key words: Nitrogen, Foliar spray, damssin, Amborssin, Sesquterpene.

INTRODUCTION

Ambrosia maritima L. plant (Damsissa), which belongs to family Composite (Asteraceae) an annual herbaceous plant widely distributed throughout the Mediterranean region and Africa. It is well known in Egypt under the name of Damsissa. It acts as antispasmodic, diuretic, and useful in bronchial asthma, spasms and frequent urination **(Ghazanfar, 1994)**. It contains important sesquiterpene lactones and flavonoids which showed molluscicidal effect **(Evans, 1996)**. The most active ingredients of this plant are ambrosin and damsin **(Shoeb and El-Eman, 1976)**. **Alard *et al*., (1991)** fed damsissa leaves to rats as a powder or as an alcoholic extract and did not report any toxicity. Damsissa is not toxic to non target organisms (rats, rabbits, algae and daphnia) **Geerts *et al*.,(1992).** Nowadays, it's used in some renal tea due to it is proved effect in renal colic and expel renal stones **(Shaker *et al*., 2000).**

Mineral fertilization with macro nutrients i.e. nitrogen, phosphorus and potassium is one of the most important agricultural practices, which have been found to improve the vegetative growth characters and enhance the yield of fruits and oil of different medicinal and aromatic plant species. In addition, different kinds of fertilizers, which contain N,P and K, are applied combined with micronutrients fertilizers to produce safe and less expensive medicinal and aromatic crops especially those cultivated for food (spices) and medicinal purposes.

Micronutrients, especially Fe, Zn and Mn act as metal components of various enzymes and also are associated with saccharine metabolism, photosynthesis, and protein synthesis and Iron has important functions in plant

metabolism, such as activating catalyses enzymes associated with super oxide dismutase, as well as in photorespiration, the glycolate pathway and chlorophyll content.

(Marschner, 1995). Therefore, sufficient amount of these nutrients in the plant is necessary for normal growth, in order to obtain satisfactory yield. Although, foliar application of various macro and micro nutrients has been proved beneficial, foliar feeding is a relatively new and controversial technique of feeding plants by applying liquid fertilizer directly to their leaves **(Baloch *et al*., 2008; Yassen *et al*., 2010).** The foliar application of mineral nutrients offers a method of supplying nutrients to higher plants that are more efficiently than methods involving root application when soil conditions are not suitable for nutrients availability **(Erdal *et al*., 2004).** One of the best methods is foliar application. On the other hands foliar feeding is an effective method for improving soil deficiencies and overcoming the soils inability to transfer nutrients to the plant **(Garcia and Hanway, 1976)**.

MATERIALS AND METHODS

Two field separate experiments were conducted during the two successive seasons of 2011and 2012 in private farm at Kom Ombo, Aswan Governorate, Egypt. The aim of the experiment was to study the effect of various rates of chemical N and foliar spray) treatments and the combinations between them on growth, yield and chemical constituents of damsissa, *Ambrosia maritima,* L. plants. Soil samples were taken at depth of 0-40 cm for physical and chemical analysis.

Table (1) Physical and chemical analysis of the used soil:

PHYSICAL PROPERTIES		CHEMICAL PROPERTIES	
Clay %	49.10	CaCO3 %	2.58
Silt %	36.27	PH	7.45
Sand %	14.63	E.C m/mhos/cm	1.36
Organic matter(%)	2.23	Total N (%)	0.12
Soil type	Clay	Avalable P %	0.17
soil		Exchange K mg /100g	2.21
		Exchange Ca++ mg /l00g	34.1
		Exchange Na+ mg /l00g	2.26

Seeds of damsissa plant were sown in the nursery bed on February 15 th and after 45 days seedlings were transplanted in the field experiment in the two seasons. The experiment unit area (plot) was 2x2.5 m2 containing three rows; the distance between rows was 60 cm, and 30 cm between hills.

The layout of this experiment was split plot design with 3 replicates. The main factor which occupied the main plots was represented by three rates of ammonium sulphate (20.5% N) chemical fertilizer (N), namely (0, 100 and 200 Kg/fed) fertilizer amounts were divided into 2 equal doses. The first dose was added one month after transplanting, the second dose was added after one month from the first dose, while the sub plots were designated to three rates Nutri-Leaf (N20-P20-K20)+Me treatments (0, Lf 100 and Lf 200 ppm.) added as foliar spray one days after irrigation till run-off, 3 times with 3weeks intervals.

Experiment, the herb was cut in 25 th June, at the beginning of flowering stage to take measurements required to search.

Recorded data:

A- Vegetative growth and yield characteristics :

1- Plant height (cm)
2- Branches number
3- Herb fresh and dry weight (g) per plant
4- Yield fresh and dry herb weight per feddan(ton)

B- Chemical composition :

1- Herb nitrogen, phosphorus and potassium percentages
2- Damssin % in the herb.
3- Ambrossin % in the herb.
4- Sesquiterpene % in the herb.

Statistical analysis:

The split plot design was used in the two experiments, the main plot was chemical fertilization (A) and sub-plot was foliar spray treatments (B). The experiment included nine treatments, with three replicates.

Data were statistically analyzed according to **MSTAT (1986)** program using 2 factor C models – 9; the differences between means were tested by using the least significant differences (L.S.D) test., herb nitrogen, phosphorus and potassium percent were determined according to **Page *et al* (1982)**. Damssin, Ambrossin and Sesquiterpene were estimated according to the method describe by **Amin (1990)**.

RESULTS and DISCUSSION

Effect of nitrogen levels and foliar spray treatments on damsissa plants;

A - Vegetative growth traits:

Plant height:

Plant height of damsissa plants was significantly increased in the two growing seasons due to the application of all studied mineral nitrogen fertilization treatments i.e. 100 and 200 kg/fed over that of unfertilized control plants, as clearly indicated in Table (1). Among the two (N) rates, plant height became gradually taller parallel to the gradual increase in the rate of (N) fertilization with significant differences being detected in the two seasons. The tallest plants were obtained due to the two (N) rates 100 and 200 kg/fed with significant differences being existed, in both seasons, between such two treatments as clearly shown in Table (1). Numerically, these two treatments augmented plant height by 52.7 and 85.1% in the first season and 66.5 and 87.4% in the second season, respectively, in comparison with that of control plants.These results are in agreement with those reported by **Nofal *et al*., (2001)** found that supplying *Ammi visnaga* plants with N, P and K (300kg ammonium sulphate + 300kg calcium super phosphate + 80kg potassium sulphate/fed) led to an increase in plant height, **Omar (2005)** pointed out that all vegetative growth traits of guar,(*Cyamopsis tetragonoloba*) plants i.e. plant height, was significantly stimulated due to NP mineral fertilization treatments in comparison with unfertilized plants and **Kamel (2009)** studied the effect of NPK fertilization (100 kg urea, 100 kg calcium superphosphate and 50 kg potassium sulphate) on guar plants obtained a considerable increase in plant height.

Concerning foliar spray treatments, Lf at 200 ppm. treatment caused a significant increase in plant height of damsissa in the first and second seasons, while Lf 100 ppm. significantly increased plant height in the second season only compared to unfertilized control, 100 and 200 ppm. gave the highest

increase in plant height (3.0 and 10.5% in the first season and 10.0 and 18.8% in the second one, comparing to untreated plants). Similar results were recorded by **Kandeel (1991)** reported that using trace elements as foliar application at 2000 mg/ L+NP had a significant effect on plant height of parsley and **Ismail (2005)** on fennel plant reported that the plant height increased by using complete fertilization concentrations to reach its maximum value by using that 4000 ppm.

Table (2): Effect of nitrogen levels and foliar spray treatments on plant height (cm) of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	31.30	33.65	36.37	33.77
N100 kg/fed.	46.64	48.58	59.53	51.58
N200 kg/fed.	63.59	63.56	60.42	62.52
Mean Lf (B)	47.18	48.60	52.11	
L. S . D at 5 %	N:2.83	Lf:3.65		N*Lf:6.33
	Second season			
Control	27.32	36.63	44.44	36.13
N100 kg/fed.	54.71	59.61	66.10	60.14
N200 kg/fed.	67.59	68.35	67.19	67.71
Mean Lf (B)	49.87	54.86	59.24	
L. S . D at 5 %	N:3.25	Lf:2.77		N*Lf:4.79

The interaction between nitrogen and foliar fertilization treatments on plant height was significant in the two seasons as clearly indicated in Table (1). The tallest plants were produced due to supplying damsissa plants with 200 Kg/fed combined with Lf (100) or (200) ppm. Numerically, these two treatments augmented plant height by 103.1 and 93.0 % in the first season and 150.2 and 145.9 % in the second season, respectively, in comparison with that of control plants.

Branches number per plant:

Table (3) show that supplying damsissa plants with mineral (N) at the rate of 200 kg/fed. caused a significant increase in number of branches in the two seasons in comparison with those of control plants. While, in the first season N fertilizer at the rate of 200kg/fed. significantly increased number branches per plant compared with other treatments. Moreover, such branches number, in both seasons were gradually augmented due to the increase in mineral (N) rate up to the recommended dose (200 kg) which resulted in the highest branches number. However, there is significant differences were detected between 100 and 200 rate for branches number in both seasons as shown in Tables (3). The increase in number of branches due to the (200kg) rate over control treatment reached 62.5 and 76.9% in the two seasons, respectively. The results agreed with those stated by **Khattab and Helmy (2003)** showed that maximum values of fennel number of branches/ plant were obtained from using 300 kg ammonium sulphate (20.6 N%), 100 kg calcium superphosphate (15.5% P_2O_5) and 50 kg potassium sulphate (48% K_2O)/ fed.,

Badran *et al* (2013) studied the influence of NPK applied on coriander plants at two rates (250: 200: 75 and 375: 300: 100 kg/fed of ammonium sulphate, calcium superphosphate and potassium sulphate) on vegetative growth. The authors obtained great and considerable increase in branches number/plant with the high rate being more effective than the low one.

Table (3): Effect of nitrogen levels and foliar spray treatments on branches number/plant of damsissa plants during the two successive seasons of 2011 and 2012. .

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	5.22	7.46	9.34	7.34
N100 kg/fed.	8.38	8.46	9.44	8.76
N200 kg/fed.	10.68	11.50	13.60	11.93
Mean Lf (B)	8.09	9.14	10.79	
L. S . D at 5 %	N: 3.12	Lf: 1.03		N*Lf: 1.74
	Second season			
Control	4.29	6.40	11.31	7.33
N100 kg/fed.	10.38	10.34	12.70	11.14
N200 kg/fed.	10.64	13.57	14.69	12.97
Mean Lf (B)	8.44	10.10	12.90	
L. S . D at 5 %	N: 2.22	Lf: 0.95		N*Lf: 1.64

Data in Table (3) on branches number as affected by treatments indicated that both Lf 100 and Lf 200 ppm. treatments increased in branches number in the two seasons over those of control treatment. However, the Lf 200 ppm. treatment gave the highest branches number. The increase in branches number due to the 200ppm. rate over control treatment reached 33.4 and 52.8% in the two seasons, respectively These results are in agreement with those reported by **Weglarz (2006),** the application of high nitrogen fertilizers increase the branches number/plant of basil.

The interaction between (N) and (Lf) treatments had a significant effect on branches number /plant in the two seasons as clearly indicated in Table (3). The numbers of branches were produced due to supplying damsissa plants with (N 200 kg) in combination with (Lf 200 ppm.) compared with control plants which gave the lowest values. The treatment increased branches number/plant by 160.5 and 242.4% in the first and second seasons, respectively, in comparison with untreated treatment.

Herb fresh and dry weights/plant:

Tables (4 and 5) showed that supplying damsissa plants with mineral N at any rate (100 and 200 kg/fed.) caused significant increase in herb fresh and dry weights per plant in the two seasons in comparison with those of control plants. Moreover, such herb fresh and dry weights per plant in both seasons were gradually augmented due to each increase in mineral N rate up to the recommended dose (200 kg/fed.) which resulted in the heaviest herb fresh and dry weights per plant., The increase in herb fresh and dry weights per plant due to the rate 200kg/fed. over control treatment reached 38.7 and 48.4 % in the first season and 40.0 and 48.8 % in the second season, respectively. agreed with those stated by **Somida (2002)** who studied the response of marigold (*Tagetes minuta*) plants to nitrogen in form of urea at 45, 90 and 180 kg N /

fed. He found that the medium rates of N was the most effective dose among the other doses to produce the heaviest fresh and dry weights of herb and **Abd El- Kader and Ghaly (2003)** observed that the addition of 400 kg\ fed of ammonium sulphate (20.6 % N) to coriander plants gave significantly better growth than control plants.

Data in Tables (4 and 5) showed that herb fresh and dry weights were increased in ascending order due to Lf 100 and Lf 200 ppm. treatments in both seasons over those of control treatment. Therefore, the dual Nutri-Leaf treatment gave the heaviest overall herb fresh and dry weights with 200ppm. reached 6.2 and 12.3% in the first season and 6.9 and 8.8 % in the second season, respectively compared with control one. In agreement with the former results were those obtained by **Attia (2003)** on guar found that fertilizer treatments at all concentrations of 1000, 2000 and 4000 ppm. gave highly significant increase in fresh weight of leaves, shoots compared to control and **Abd El-Azim (2003)** on *Salvia officinalis* plant, concluded that the application of NPK at (150:100:15 kg/fed) led to produce the highest yield of herb fresh weight per plant and fed. in comparison with control.

The interaction between N and Lf treatments was significant in the two seasons for herb fresh and dry weights per plant. It is interesting to observe that significant differences were detected between the recommended N fertilization treatment (200 kg/fed.) in combination with Lf 200 ppm. gave the best results which were greatly better than all fertilization treatments. which gave the heaviest fresh and dry weights per plant increased by 46.1 and 48.2 % in the first and 61.3 and 59.5% in the second seasons respectively, in comparison with untreated treatment. as clearly shown in Tables (4 and 5) in the two seasons

Table (4): Effect of nitrogen levels and foliar spray treatments on herb fresh weight/plant (gm) of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	515.3	517.8	521.8	518.3
N100 kg/fed.	560.1	563.3	570.8	564.7
N200 kg/fed.	662.4	741.9	753.0	719.1
Mean Lf (B)	579.3	607.7	651.2	
L. S . D at 5 %	N: 3.46	Lf: 4.66		N*Lf: 9.0
	Second season			
Control	512.4	514.3	520.9	515.8
N100 kg/fed.	562.6	564.2	572.4	566.4
N200 kg/fed.	656.6	750.7	759.5	722.2
Mean Lf (B)	577.2	609.7	617.6	
L. S . D at 5 %	N: 3.78	Lf: 3.41		N*Lf: 7.91

Table (5): Effect of nitrogen levels and foliar spray treatments on herb dry weight/ plant(gm) of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	78.30	80.29	83.24	80.61
N100 kg/fed.	87.32	89.26	97.99	91.52
N200 kg/fed.	108.2	124.3	126.3	119.6
Mean Lf (B)	91.29	97.95	102.5	
L. S . D at 5 %	N: 1.04	Lf: 1.06		N*Lf: 1.84
	Second season			
Control	79.30	80.30	82.31	80.64
N100 kg/fed.	89.25	91.37	93.31	91.31
N200 kg/fed.	109.2	124.2	126.5	120,0
Mean Lf (B)	92.58	98.63	100. 7	
L. S . D at 5 %	N: 0. 90	Lf: 1.26		N*Lf: 2.17

Yield fresh and dry herb weight per feddan(ton):

The herb fresh and dry weight calculated as ton/ fed. as affected by mineral N fertilization treatments, as illustrated in Tables (6 and 7) and Figs.(1,2, 3, and 4). The heaviest fresh and dry weights of damsissa were obtained due to ammonium sulphate fertilizer at 200 followed by 100 kg/fed. The increase in herb fresh and dry weights per fed. by 200kg/fed. over those of control was 38.8and 88.5% in the first season, and 40.0 and 80.9% in the second season, respectively, compared to without any fertilization. as a result of N was reported by **Kamel (2009)** on guar, **Joshi *et al.*, (2003)** found that application of fertilizers N at 80 kg/ ha, P at 60 kg/ ha and K at 30 kg/ ha increased seed yield (1993.75 kg/ ha) compared to the control plants (1050 kg/ ha) of *Ammi majus*, and **Khattab and Helmy (2003)** recoded that the maximum values of fruit yield per plant and per fed. of fennel plant were obtained from using 300kg ammonium sulphate (20.6% N), 100 kg super phosphate and 50kg potassium sulphate per fed.

Table (6): Effect of nitrogen levels and foliar spray treatments on fresh weight yield (ton/fed) of damsissa plants during the two successive seasons of 2011and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	11.34	11.39	11.48	11.40
N100 kg/fed.	12.32	12.39	12.56	12.42
N200 kg/fed.	14.57	16.32	16.57	15.82
Mean Lf (B)	12.75	13.37	13.53	
L. S . D at 5 %	N: 0.20	Lf: 0.14		N*Lf: 0.25
	Second season			
Control	11.27	11.32	11.46	11.35
N100 kg/fed.	12.38	12.41	12.59	12.46
N200 kg/fed.	14.45	16.52	16.71	15.89
Mean Lf (B)	12.70	13.41	13.59	
L. S . D at 5 %	N: 0.26	Lf: 0.14		N*Lf: 0.23

Table(7): Effect of nitrogen levels and foliar spray treatments on dry weight yield (ton /fed) of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	1.73	1.81	1.93	1.82
N100 kg/fed.	2.09	2.17	2.25	2.17
N200 kg/fed.	2.93	3.61	3.75	3.43
Mean Lf (B)	2.25	2.53	2.64	
L. S . D at 5 %	N: 0.045	Lf: 0.041		N*Lf: 0.079
	Second season			
Control	1.77	1.81	1.90	1.83
N100 kg/fed.	2.17	2.26	2.33	2.25
N200 kg/fed.	2.90	3.36	3.66	3.31
Mean Lf (B)	2.28	2.47	2.63	
L. S . D at 5 %	N: 0.056	Lf: 0.058		N*Lf: 0.097

Concerning Nutri-Leaf treatments, the two tested levels, Lf 100 and Lf 200 treatments caused considerable increase in herb fresh and dry weights per fed. of damsissa plants over those of untreated plants in both seasons. The dual Nutri-Leaf treatment Lf 200 ppm. was the most effective treatment, followed by Lf 100 ppm. treatment. The dual Nutri-Leaf treatment increased herb fresh weight/fed. at 200Lf ppm. was 6.12 and 17.3 % in the first season and 7.01 and 15.4% in the second season, respectively, in comparison with untreated treatment. These results are in the conformity with those obtained by **Attia (2003)** on *Cyamopsis tetragonoloba* indicated that the treatments of foliar sprays number at 2, 3 and 4 sprays resulted in highly significant increase in dry weight of leaves. Also, the complete fertilizer treatments at 1000, 2000 and 4000 ppm. gave highly significant increase in dry weight of leaves as compared to control. Moreover, the interaction treatments between foliar sprays number at 2, 3 and 4 sprays and complete fertilizer concentrations at 1000, 2000 and 4000 ppm. resulted in highly significant increase in dry weight of leaves, stem and root per plant., **Abd El-Azim (2003)** on *Salvia officinalis* plants, found that supplying the plants with NPK at (150 kg N, 100 kg P and 150 kg K) per fed. gave the highest dry herb yield per feddan in comparison with untreated plants., **Ismail (2005)** on fennel plants found that complete fertilizer treatments at 3000 and 4000 ppm caused highly significant increase in dry weights of leaves and stem per plant as compared to control., and **Sharma *et al*.,(2000)** on chili plants using compound liquid fertilizer containing most macro and micro nutrients (Polyfeed and Multi) along with NPK and mentioned that these fertilizers provide nutrients to the plant by foliar application and significant effect on yield fresh and dry herb weight per fed.

The interaction between mineral N and Nutri-Leaf treatments for herb fresh and dry weights per fed. was significant in the two seasons as clearly indicated in Tables (6 and 7) and Fig. (1,2,3 and 4). The heaviest weights of herbs were produced due to supplying damsissa plants with 200 kg N in combination with 200 ppm. Lf which gave the heaviest fresh and dry herb/fed. In the two seasons. It was found that the herb fresh and dry weights per fed. were obtained due to the use of combination increased 46.1 and 116.8 % in the first season and 48.3 and 106.8% in the second season, respectively, in comparison with unfertilized treatment.

Fg1,2,3,4

B- Chemical constituents:

Herb nitrogen, phosphorus and potassium %:

Data in Tables (8, 9 and 10) showed significant increase in nitrogen, phosphorus and potassium percentage in the herb of damsissa plants due to the application of all mineral fertilization rates in comparison with those of control. Mineral N at 200 kg/fed. followed by 100 kg/fed. treatments gave the highest percentages of N,P and K compared to control. These results are in harmony with the findings of **Somida (2002)** on *Tagetes minuta* and **Badran *et al.*, (2007)** on fennel plants obtained the highest value of N, P and K percentages of herb with ammonium sulphate at 90 kg N/fed plus potassium sulphate at 60 kg K_2O/fed. **Abd El–Azeem (2003)** on *Salvia officinalis*, found that NPK fertilizer rate at 150:150:100 kg/fed caused a significant increase in the contents of N, P and K in the leaves.

Concerning Nutri-Leaf treatments, noticeable differences were detected due to the application of Nutri-Leaf treatments in the two seasons compared to the untreated plants. The highest N,P and K % in the herb were obtained by LF 200 ppm. followed by LF 100 ppm. treatment as clearly indicated in Tables (8, 9 and 10).

Table (8): Effect of nitrogen levels and foliar spray treatments on herb nitrogen% of damsissa plants during the two successive seasons 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	1.825	1.854	1.883	1.854
N100 kg/fed.	1.908	1.936	1.956	1.933
N200 kg/fed.	2.156	2.314	2.358	2.276
Mean Lf (B)	1.963	2.035	2.067	
L. S . D at 5 %	N: 0.042	Lf: 0.030		N*Lf: 0.067
	Second season			
Control	1.874	1.858	1.831	1.854
N100 kg/fed.	1.966	2.121	2.183	2.090
N200 kg/fed.	2.199	2.275	2.307	2.260
Mean Lf (B)	2.013	2.085	2.107	
L. S . D at 5 %	N: 0.028	Lf: 0.034		N*Lf: 0.076

Table (9): Effect of nitrogen levels and foliar spray treatments on herb phosphous % of damsissa plants during the two successive seasons 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	0.191	0.228	0.205	0.208
N100 kg/fed.	0.222	0.259	0.237	0.239
N200 kg/fed.	0.233	0.272	0.259	0.255
Mean Lf (B)	0.215	0.253	0.234	
L. S . D at 5 %	N: 0.011	Lf: 0.017		N*Lf: 0.038
	Second season			
Control	0.204	0.236	0.220	0.220
N100 kg/fed.	0.236	0.268	0.252	0.252
N200 kg/fed.	0.248	0.289	0.273	0.270
Mean Lf (B)	0.229	0.264	0.248	
L. S . D at 5 %	N: 0.013	Lf: 0.015		N*Lf: 0.034

Table (10): Effect of nitrogen levels and foliar spray treatments on herb potassium % of damsissa plants during the two successive seasons 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	0.854	0.912	0.893	0.886
N100 kg/fed.	0.877	0.935	0.916	0.909
N200 kg/fed.	0.902	0.960	0.941	0.934
Mean Lf (B)	0.878	0.936	0.917	
L. S . D at 5 %	N: 0.013	Lf: 0.015		N*Lf: 0.034
	Second season			
Control	0.918	0.946	0.999	0.954
N100 kg/fed.	0.950	1.119	1.129	1.066
N200 kg/fed.	0.987	1.134	1.125	1.082
Mean Lf (B)	0.952	1.066	1.084	
L. S . D at 5 %	N: 0.011	Lf: 0.012		N*Lf: 0.027

The results are agreement with those reported by Kandeel (2002) in the process of testing combined fertilizers NPK which comprise Fe, Mn, Zn over basil has established that all parameters of herb nitrogen, phosphorus and potassium content in the leaved of basil plants were greatly promoted due to the application of the different concentration., and **Engku Ismail *et al*., (2001)** has reported the best percentage of N and P in the leaves of basil plants with application of NPK and microelements.

The interaction between N and Nutri-Leaf treatments was significant in the two seasons. The highest N, P and K% were obtained due to supplying damsissa plants with N at 200 kg/ fed in combination with Nutri-Leaf at 200 ppm. treatment as clearly shown in Tables (8, 9 and 10).

Herb damssin %:

Data in Table (11) showed significant increase in damsin percentage in the herb of damsissa plants due to the application of all mineral N fertilization rates in comparison with those of control. Mineral N at 200 followed by 100 kg/fed. treatment gave the highest percentages of damsin% compared to control. Therefore, the highest value of damssin in the herbs were obtained due to N at 200 followed by 100 kg/fed Treatment.

The increase in herb damssin% due to mineral N at 200kg/fed. in comparison with control treatment, reached 67.7 and 53.5 % in the first and second season, respectively. These results are in harmony with the findings of **Sawfat and Badran (2002)** found that supplying cumin plants with 40 N : 30 P_2O_5: 50K_2O / fed. caused a great augmentation in essential oil yield/ fed., and **Khattab and Helmy (2003)** mentioned that NPK fertilization (300 + 100 + 50 kg/ fed.) led to maximum values of oil yield (ml/ plant and liter/fed.) of fennel plants.

Table (11): Effect of nitrogen levels and foliar spray treatments on damssin ercentage of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	1.07	1.40	1.53	1.33
N100 kg/fed.	1.60	1.77	1.90	1.76
N200 kg/fed.	2.12	2.20	2.36	2.23
Mean Lf (B)	1.60	1.79	1.93	
L. S . D at 5 %	N: 0.06	Lf: 0.09		N*Lf: 0.16
	Second season			
Control	1.07	1.46	1.73	1.42
N100 kg/fed.	1.46	1.83	1.87	1.72
N200 kg/fed.	2.08	2.18	2.28	2.18
Mean Lf (B)	1.54	1.82	1.96	
L. S . D at 5 %	N: 0.22	Lf: 0.18		N*Lf: 0.31

Concerning Nutri-Leaf treatments, noticeable differences were detected due to the application of Nutri-Leaf treatments in the two seasons compared to the untreated plants. The highest damssin in the herb were obtained by Lf 200 followed by Lf 100 ppm. treatments as clearly indicated in Table (11). In the first season, while, Lf 100 plus dual Nutri-Leaf gave almost equal results to those given by the Lf 200 ppm. traditional treatment in the second season. The increase in herb damssin% due to mineral Lf at 200 ppm. In comparison with control treatment, reached 20.6 and 27.3 % in the first and second season, respectively. The results are in agreement with those reported by **Ismail (2005)** on fennel plants, recorded that all the concentrations of complete fertilizer at1000, 2000, 3000 and 4000 ppm. gave highly significant increase in the oil percentage, oil yield per plant and fed compared to control.

The interactions between mineral N and Lf for damssin% in the herb of damsissa plants were significant in the two season as shown in Table (11) and Figs. (5 and 6). The highest percentages of damssin in the herb were obtained due to the use of N 200kg/fed. in combination with Lf 100 or 200 ppm. treatment. The increase in damssin % due to such two combined treatments recorded 105.6 and 103.7% in the first and second seasons, respectively, in contrast to 120.6 and 113.1% in the first and second seasons, respectively for the control unfertilized treatment.

Herb ambrossin%:

Ambrossin percentage in the herb of damsissa plants as affected by mineral N fertilization treatments are presented in Table (12) and Fig. (7 and 8).The high percentage of ambrossin was obtained due to the application of N 200 kg followed by 100 kg/fed. treatments was significant differences between them in the first and second seasons. A slight increase in the ambrossin % was noticed due to increasing the rate of N to 200 kg/fed., reached 112.4 and 115.3% in the first and second seasons,respectively,. These results concerning NPK are in harmony with those obtained by **Osman (2000)** found that among different NPK chemical fertilization additions, the medium level 80: 30: 24 increased oil yield / plant of coriander plants and **Bhuvaneshwari *et al.*,**

(2003) reported that the interaction of N (80 kg/ ha), phosphorus and potassium (each at 60 kg/ ha) treatment gave the highest essential oil yield of 24.4 l/ ha of anise plants.

Table (12): Effect of nitrogen levels and foliar spray treatments on ambrossin percentage of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	0.88	1.01	1.02	0.97
N100 kg/fed.	1.66	1.72	1.77	1.72
N200 kg/fed.	1.93	2.08	2.17	2.06
Mean Lf (B)	1.49	1.60	1.65	
L. S . D at 5 %	N: 0.04	Lf: 0.05		N*Lf: 0.08
	Second season			
Control	0.83	1.04	1.07	0.98
N100 kg/fed.	1.67	1.77	1.80	1.75
N200 kg/fed.	2.10	2.09	2.15	2.11
Mean Lf (B)	1.53	1.63	1.67	
L. S . D at 5 %	N: 0.04	Lf: 0.03		N*Lf: 0.06

Data listed in Table (12) revealed that the dual Nutri-Leaf treatment (Lf 100and Lf 200 ppm.) significantly increased ambrossin % in both seasons compared with unfertilized plants, while, two treatments caused insignificant increase in ambrossin % in the first and second seasons between them. Regarding the influence of Nutri-Leaf treatment in increasing ambrossin %, the increase in ambrossin percentage due to the (200kg) rate over control treatment reached 10.7 and 9.2% in the two seasons, respectively. its was emphasized by **Badran and Safwat (2004)** showed that essential oil % in the fruits of fennel plants was not significantly affected by mineral fertilization treatments, while, oil yield /fed. was significantly increased due to all mineral fertilization treatments compared with unfertilized plants the best treatment was 40 kg N /fed. compared to the control. **Badran *et al.*, (2007)** concluded that NPK fertilization treatments at the rates of 100: 150: 50 or 150: 225: 75 kg/fed. increased essential oil % and essential oil yield /plant and /fed of fennel plants. **Khalil (2002)** showed that NPK + micronutrients increased significantly essential oil % of rosemary plants.

The interaction between mineral N and Nutri-Leaf treatments was significant for herb ambrossin % in both seasons. The percentage of ambrossin were produced due to supplying damsissa plants with 200 Kg/fed combined with Lf (200) ppm. Numerically, these two treatments augmented ambrossin% by 146.6 and 159.0% in the first and second seasons, respectively, in comparison with that of control plants.

Fg 5, 6, 7,8

Herb sesquiterpene%:

Obtained data in Table (13) indicated that N fertilizer at low and high rates caused significant increase in percentage of sesquiterpene in herb of damsissa plants in the two seasons in comparison with that of unfertilized control plants. Moreover, the sesquiterpene % in the herb was gradually increase parallel to the increase in N rate until the high rate (200kg /fed.) The increase in sesquiterpene, reached 97.7 and 87.4% in the first and second seasons respectively, in comparison with control plants. Similar results were reported by **Mohsen (2002)** found that NPK fertilization increased the percentage and oil yield per plant of *Ocimum basilicum* L.cv.Grand Vert. The most effective rate (100 kg/fed.) increased essential oil percentage and oil yield per plant. **Abd El–Azeem (2003)** on *Salvia officinalis*, found that NPK fertilizer rate at 150:150:100 kg/fed caused a significant increase in the contents of total oil percentage in the leaves.

Table (13): Effect of nitrogen levels and foliar spray treatments on sesquiterpene percentage of damsissa plants during the two successive seasons of 2011 and 2012.

Nitrogen (A)	Nutri-Leaf (N20-P20-K20)+Me(Lf) (B)			
	Control	LF100ppm.	LF200ppm	Mean N (A)
	First season			
Control	1.55	2.41	2.55	2.17
N100 kg/fed.	3.20	3.47	3.67	3.45
N200 kg/fed.	4.04	4.30	4.52	4.29
Mean Lf (B)	2.93	3.39	3.58	
L. S . D at 5 %	N: 0.07	Lf: 0.11		N*Lf: 0.19
	Second season			
Control	1.60	2.50	2.81	2.30
N100 kg/fed.	3.13	3.60	3.60	3.44
N200 kg/fed.	4.19	4.31	4.43	4.31
Mean Lf (B)	2.97	3.47	3.61	
L. S . D at 5 %	N: 0.23	Lf: 0.19		N*Lf: 0.34

Concerning Nutri-Leaf (Lf) treatments, the highest concentration significantly augmented the sesquiterpene% in the herbs in the two seasons over that of unsprayed control plants as indicated in Table (13). The high rate of Lf 200 followed by Lf 100 ppm. produced the highest percentage of sesquiterpene in the first season, whereas, differences among these two treatments no significant was observed in the second season. Results also indicated that treated plants with much superior in sesquiterpene percentage of herb compared with untreated plants. came to 22.2 % in the first season, while the increase reached 21.6 and 16.8% in the second season, respectively, compared with control plants. In this regard, **Aziz and El-Sherbeny (2004), Said-Al Ahl (2005)** on dill and **Said-Al Ahl and Omer (2009)** on coriander indicated that linalool was increased in the herb and seeds with treatment of zinc and mixture of zinc + iron compared to control.

The interaction between mineral N and Nutri-Leaf (Lf) treatments for sesquiterpene percentage in the herbs was significant in the first season, while, it was not significant in the second season as shown in Table (13) and Fig. (9 and 10). Treatment at 200 Kg /fed. in combination with (Lf) treatment at rate 200 ppm. in the first season, recorded 191.6% for control treatment, while in the second season, recorded 176.9 and 169.4%, respectively, (200kg N x 200ppm. Lf) followed by (200 kg Nx100ppm. Lf) compared with the control.

Fg 9,10

REFERENCES

Abd El-Azim, W.M. 2003. Production of *Salvia officinalis,* L. plant under North Sinai condition Ph. D. Thesis, Fac. Agric., Cairo Univ., Egypt.

Abd El-Kader, H.H. and Ghaly, N.G. 2003. Effects of cutting the herb and the use of nitrobein and phosphorein associated with mineral fertilizers on growth, fruit and oil yields and chemical composition of the essential oil of coriander plants (*Coriandrum sativum,* L.) J. Agric. Sci. Mansoura, Univ. 28(3): 2161 – 2171.

Ahmed, E.F. 2007. Evaluation of certain fertilizing programs on anise and black cumin productivity. Sinai Conditions. Res. J. Agric. Biol. Sci., 4(6): 717-724.

Alard, F.; Stievenart, C.;Vanparys, P.; Thilemans, L. and Geerts, S. 1991. Toxicity and mutagenicity of the molluscicidal plant *Ambrosia maritima* L. Drug. Chem. Toxicol., 14 (4): 353- 373.

Amin, W.M.A. 1990. Apharmacognosticat study of certain Egyptian molluscidal plants. Pharmacognosy Department. Thesis, ph. D. Faculty of Pharmacy, Cairo Uni.

Attia, D.M.G. 2003. Physiological studies on guar plants in sandy soil. M. Sc. Thesis, Fac. Agric.,Suez Canal University, Egypt.

Attallah, S.A. and Mohamed, G.A. 2004. Response of canola (*Brassica napus*, L.) to nitrogen, phosphorus and potassium fertilizers under El-Minia conditions. Minia. J. of Agric. Res.& Dev. Vol. (24) No. 4 PP. 677-690, 2004.

Ayat, A.M. 2007. Effect of fertilization with macro, micronutrients and antioxidants on coriander (*Coriandrum sativum,* L.) plants growth in new reclaimed land. M. Sc. Thesis, Fac. of Agric. Minia Univ.

Aziz, E.E. and El-Sherbeny, S.E. 2004. Effect of some macro and micro-nutrients on growth and chemical constituents of *Siderites montana* L. as a new plant introduced into Egypt. Arab. Uni. J. Agric. Sci. Ain. Shams. Uni. Cairo Egypt, 12 (1): 391-403. 2004.

Badran, F.S. and Safwat, M.S. 2004. Response of fennel plants to organic and biofertilizers in replacement of chemical fertilization. Second. International Conference of Organic Agriculture, 25 – 27 March 2004, Cairo, Egypt.

Badran, F.S.; Abdallah, N. M. and Ibrahim, S.M. 2007. Response of fennel plants to seeding rate and partial replacement of mineral NPK by biofertilization treatments. Proc. Of the 8th African Crop. Sci.Conf., El- Minia, Egypt, 27- 31, m Oct. 2007, Vol. 8, Part 1: 417- 422.

Badran, F. S.; Al-Badawy, A. A; El-Sayed, A. A. and Salah El- Deen, R. M. 2001. Effect of nitrogen fertilization sources on growth, yield, chemical composition and guaran content of guar *(Cyamopsis tetragonoloba,* Taub.) plants.The Fifth Arab. Hort. Conf. Ismailia, Egypt, March 24- 28, 2001, P. 9-15.

Badran, F.S.; Attia, F.A. and Ayat, A.M. 2013. Effect of macro/ micro fertilization treatments, as well as, salicylic and ascorbic acids on growth, fruit yield and essential oil of coriander. Plants grown in sandy soil. The first Assiut Inter. Conf. of Horticulture, 24- 27th Feb., 2013.

Baloch, Q.B., Chachar, Q.I., Tareen, M.N. 2008. Effect of foliar application of macro and micro nutrients on production of green chilies (*Capsicum annuum* L.). J. Agric. Tech., 4(2): 177-184.

Bhuvaneshwari, F.; Sreeramu, B.S. and Srinivasa, K.N. 2003. Influence of nitrogen, phosphorus and potassium levels on growth, seed yield and essential oil content in anise (*Pimpinella anisum*, L.) Journal of Spices and Aromatic Crops, 11(2): 112- 117.(Hort. Abst. , 73(12): 11071).

Ebrahim, M.M.H. 2005. Effect of some agricultural treatments on roselle plant in the cultivated soils. M. Sc. Thesis, Fac. Agric. Zagazig Univ., Egypt.

Erdal, I., Kepenek, K. and Kizilgos, I. 2004. Effect of foliar iron applications at different growth stages on iron and some nutrient concentrations in strawberry cultivars. Turk J.Agric.For.,28: 421-427.

Evans, W.C. 1996. In trease and evans pharmacogenosy saunders. Co. Ltd, 4th ed., Lond, Philadelphia, Toronto, Tokyo, p.50.

Garcia L.R, Hanway J.J. 1976. Foliar fertilization of soybeans during the seed-filling period. Argons. J. 68:653-657.

Geerts, S., Alard, F., Belot, J. and Sidhom, M. 1992. The toxicity of *Ambrosia maritima* to snails and non target organisms. In "vector control of schistosomiasis using native african plant Symoens, J.J, Greets, S. and Trieste, L. eds. ,Royal Academy of overseas Sciences, Brussels, p.89-100.

Ghazanfer, S. 1994. CRC Hand book of Arabian Medicinal Plants. CRC. Press, Boca Raton,p.265.

Engku Ismail E.A., Mohammed, C.H. and Salbiah, H. 2001. Fertilization and irrigation of basil on BRIS soil. Towards modernisation of research and technology in herbal industries. Proceedings of the Seminar on Medicinal and Aromatic Plants, 24- 25 July 2001 2002, pp. 234-236.

Ismail, E.G. 2005. Study on fennel in the new cultivated soils. Ph.D. Thesis, Fac. Agric., Zigzag Univ., Egypt.

Joshi, D. N., Bhojvaid, P. P. and Dobriyal, M. J. 2003. Effect of chemical fertilizer (NPK) on seed production of *Ammi majus* Linn. and analysis of cultivation cost. International. J. of. Forest. Usufructs. Management. 2003, 4:1, 59-63.

Kamel, N. M. 2009. Physiological studies on some medicinal and aromatic plants. M. Sc. Theses. Fac. of Agric., Minia Univ. Egypt.

Kandeel, A.M. 1991. Influence of soil and foliar nutrition on growth and volatile oil content of parsley (*Petroselinum crispum* Mill). Ann. Agric. Sci. 36,1, 155-162.

Kandeel, A.M. 2002. Effect of foliar application with some micro nutrients on the vegetative growth, volatile oil yield and chemical composition of Ocimum basilicum L. plant. Fertilization and irrigation of basil on BRIS soil. Annals of Agricultural Science (Cairo), 47 1, pp. 373-387.

Khalil, M.y, El-Sherbeny, S.E. 2005. Behavior of three *Mentha spp*, recently cultivated under Egyptian condition in relation to some foliar fertilizers. Egypt J. Appl. Sci 2005; 20:163-83.

Khalil, M.Y. 2002. influence of compost and foliar fertilization on growth and chemical composition of *Rosmarinus officinalis* L. Egypt J. Appl Sci 17:684-699.

Khattab, M.E. and Helmy, L.M. 2003. Productivity and yield quality of fennel plants as affected by foliar application with some amino acids. J. Agric. Sci. Mansoura Univ., 28 (5): 3893- 3909.

Marschner, H. 1995. Mineral Nutrient of Higher Plants. Second Ed., Academic Press Limited. Harcourt Brace and Company, Publishers, London, pp: 347- 364.

Mohamed, S.A. and Naguib, N. Y. 2002. Influence of foliar sprays with potassin P, N, ascorbic and their combination on yield parameters and chemical constituents of seeds of fenugreek plants Arab. Univ. J. Agric. Sci. Ain Shams Univ.Cairo,10(3): 879-891. Toxins, 4(2): 69-100.

Mohsen, M.M. 2002. Sweet basil herb and oil production as affected by chemical and organic fertilization.M. Sc. Thesis, Fac. of Agric., Cairo Univ.

MSTAT-C, 1985. A software program for the design, management, and analysis of agronomic research experiments (Version 4.0) Michigan State Universe ity.

Nofal, E.S.; Kandeel, Y.R.; Menesi, F.A.; Reda, K.A.; Taher, M. and Zaki, Z.T. 2001. Effect of some cultural practices on growth and chemical composition of some medicinal plants in Northern Sinai (*Ammi visnaga,* L.) The Fifth Arabian Hort. Conf., Ismailia, Egypt, 51 – 60.

Omar, M.D. 2005. Effect of some agricultural treatments on growth, yield and active ingredient of guar (*Cyamopsis tetragonoloba,* L.) plants. Ph.D. Thesis, Fac. of Agric. Minia. Univ.

Osman, Y.A. 2000. The possibility of production of coriander (*Coriandrum sativum*, L.) under Sinai conditions. Ph. D. Thesis, Fac. Agric., Cairo, Univ.

Page, A.L.; Miller, R.H. and Kenney, D.R. 1982. Methods of Soil Analysis, Part II. Amer. Sic. Agro. Inc., Madison, Wisconsin, U.S.A.

Pande, P. Anwar, M. Chand, S. Yadav, V.K. and Patra, D.D. 2007. Optimal level of iron and zinc in relation to its influence on herb yield and production of essential oil in menthol mint. Communications in Soil Science and Plant. Analysis, Vol.38, Issue (5 & 6): 561-578.

Shaalan, M.N., Abd–El-Latif, T.A.; Soliman, S.G. and El-Gaawwas, E.O. 2001. Effect of some chemical and biofertilization treatments on rosella plants " *Hibiscus sabdariffa* , L. Egypt. J. Agric. Res., 79 (2). Arabic)

Said-Al Ahl, H.A.H. and Omer, E.A. 2009. Effect of spraying with zinc and/or iron on growth and chemical Composition of coriander(*Coriandrum sativum* L.) harvested at three stages of development. J. Medicinal Food Plants, Vol. 1 (2): 30-46.

Said-Al Ahl, H.A.H. 2005. Physiological studies on growth, yield and volatile oil of dill (*Anethum graveolens* L.) . Ph. D. Thesis, Fac. Agric. Cairo Uni. Egypt.

Saleh, S.I, hosni Y.A, darwish M. 2002. Effect of urea and crystalon (19-19-19) on the vegetative growth and chemical composition of *Epiprennum pinnatum* "aureum", bunt plants. Egypt. J. Hort 20002; 7:497-511.

Safwat, M.S. and Badran, F.S. 2002. Efficiency of organic and biofertilizers, in comparison with chemical fertilization on growth, yield and essential oil of cumin plants. The 9th Conf. of Medicinal and Aromatic plants, Cairo, Egypt, 2002.

Shaker, M.M., Shuab, S.M. and Khater, M.R. 2000. In vitro studies on *Ambrosia maritima:* 1-Morphogenic responses and algal toxins elicitation, Aab. J. Biotech., 3(2), 217-224.

Sharma, B.R., Chadha, A.P.S. and Bajpai, H.K. 2000. Response of chili *(Capsicum annuum* Linn.) to nitrogen and phosphorus levels under irrigated condition. Advances in Plant Sciences 9(2): 213-214.

Shoeb, H.A. and El-Eman, M.A. 1976. The molluscicidal properties of natural products from *Ambrosia maritima*. Egypt. J. Bilharz., 3(2),157-167.

Singh, M. 2004. Effect of plant spacing, fertilizer, modified urea material and irrigation regime on herb, oil yield and oil quality of rosemary in semi-arid tropical conditions. J. Hort. Sci.

Somida, E.G. 2002. Effect of organic manure, nitrogen and potassium fertilization on growth, flowering and chemical constitutes of (*Tagetes minuta*, L.) plants. Biotechnology, 79(3) :411-415.

Weglarz, Z. 2006. Effect of NPK fertilization on Ocimum basilicum yield and essential oil content. Kerteszeti. Egyetem. Kozlemenyei, 45, 65-73 (Hu).

Yassen, A., Abou El-Nour, E.A.A. and Shedeed, S. 2010. Response of wheat to foliar spray with urea and micronutrients. Journal of American Science, 6(9): 14-22.

تأثير معدلات التسميد النتروجيني والأسمدة الورقية علي النمو والمحصول والمادة الفعالة في نبات الدمسيسة

مرتضي رضا خاطر -ياسر علي محمد - خالد عبد المنعم همام
قسم بحوث النباتات الطبية والعطرية - معهد بحوث البساتين
مركز البحوث الزراعية -مصر

أجريت التجربة في مزرعة خاصة في كوم أمبو بأسوان خلال موسمي ٢٠١١- ٢٠١٢ لدراسة استجابة نبات الدمسيسة للتسميد بمعدلات مختلفة من التسميد النيتروجيني (صفر -١٠٠ -٢٠٠ كجم/ف) كتسميد أرضي مع ثلاث مستويات من مركب النوتري ليف (صفر -١٠٠ - ٢٠٠) جزء في المليون كسماد ورقي وتأثيرها علي الصفات المورفولوجية والمحتوي الكيماوي لنبات الدمسيسة.

أظهرت النتائج أن جميع المعاملات التي أستخدم فيها السماد النتروجيني من سلفات الأمونيوم والسماد الورقي المركب سواء كان منفردا أو مجتمعا أدي إلي زيادة الصفات الخضرية (طول النبات - عدد الفروع - الوزن الطازج والجاف) مقارنة بالكنترول.

أظهرت النتائج أن كل معاملات التسميد أدت إلي زيادة واضحة في النسبة المئوية لكل من النتروجين والفوسفور والبوتاسيوم في العشب حيث بلغ أقصاه نتيجة المعاملة (٢٠٠ كجم/ف سلفات نشادر) مع ٢٠٠ جزء في المليون من مركب النوتري ليف.

كما أظهرت النتائج ان جميع المعاملات تحت الدراسة كان لها تأثير إيجابي علي المواد الفعالة (الدمسين - أمبروزين -سيسكو تربين) في العشب وأعطت المعاملة (٢٠٠ كجم/ف سلفات نشادر) مع ٢٠٠ جزء في المليون (نوتري ليف أعلي القيم للمواد الفعالة تحت الدراسة.

يوصي الباحثين باستخدام التسميد النتروجيني بمعدل ٢٠٠ كجم/ف سلفات نشادر مع ٢٠٠ جزء في المليون من التسميد الورقي حيث أن هده المعاملة أعطت أعلي إنتاجية من محصول العشب وكذلك المواد الفعالة.